Remarks/Arguments

Claims 1-5 and 7-8 stand rejected under 35 U.S.C. 103(a) as being unpatentable over HORY (PCT Publication No. WO 99/421421, as translated in US Patent No. 6,767,499) in light of OLBERG (U.S. Patent No. 1429089) and PLATSCH (US Patent No. 5964155). The present invention is directed to a device for making thin layers of a powder or a mixture of powders for use in a process based on the action of a laser on a material contained in a thermal enclosure. In the method described in the HORY reference, the scraper is connected to a roller that is free to rotate and that is driven in translation by its own weight. The roller acts behind the scraper and compacts the powder or powder mixture. The scraper and the roller move in a work plane provided with guide rails, and studs on the flanks of the rails which thus enable the scraper to be tilted at the end of its stroke. When using arbitrary powders or powder mixtures, such a device does not make it possible in a reliable manner to obtain a thickness, a surface quality, and a shape as desired for the layer deposited in that way. Furthermore, in an atmosphere that may be at a temperature that can reach 900°C, it is difficult to use such a device for making layers. After a few passes, an abrasion and wear phenomenon appears on the various parts situated in the enclosure. The abrasion and the wear spoil the uniformity of the layers as deposited in that way. In addition, those two members are guided inside the thermal enclosure.

Insofar as the enclosure is subjected to a temperature that can be as high as 900°C, the means for guiding the scraper and the roller are subject to expansion. They do not necessarily expand by the same amounts, thereby degrading the accuracy with which the powder or powder mixture is laid out in layers. Furthermore, driving the roller under its own weight does not make it any easier for it to be guided in a regular and accurate manner. In practice, in addition to high manufacturing cost, it is practically impossible with such a system to lay a plurality of thin layers in succession having a thickness of less than 100 micrometers (μm). Even with layers thicker than 100 μm, when the grain size of the powder or powder mixture makes that possible, the thicknesses and the uniformity of the layers as deposited in that way are often insufficient to allow a laser to act on the material, in particular to allow parts to be sintered. The present invention seeks more particularly to remedy these drawbacks by proposing a device enabling powder or powder mixtures to be laid in thin and uniform layers having a minimum thickness of about 5 μm, and capable of doing this at high temperatures of up to about 1200°C, while ensuring that the layers are of the quality needed for a laser to act on the material, and while making it possible to avoid the consequences of a temperature gradient and the effects of abrasion on the means for laying the layers.

The Examiner has indicated that the HORY reference shows the feature of "enabling the cylinder to be guided and driven from outside said enclosure (60) (HORY: column 5, lines 30-38)". The HORY reference discloses two rods 96, disposed on each end of the roller 94, which permits connecting the screed 90 to the compacting roller 94 which is fixed to an arm 98 connected to control means 100 (see HORY column 5, lines 30-34). As seen in FIGs 2 and 3 of HORY, the two rods 96, screed 90 and arm 98 are provided within the enclosure. However, the present invention discloses that the cylinder 12 is provided at each of its ends in a central position with a respective stub axle 13, 14 extending along the longitudinal axis AA', such that the stub axles 13, 14 project outside the bottom by passing through its sidewalls, and on the outside they are associated with a motor-driven drive and guide device(see paragraph [0034]). One of skill in the art reading Applicant's specification and drawings would understand that the limitation of "enabling the cylinder to be guided and driven from outside said enclosure" is not found in the prior art as disclosed by Applicant. The HORY reference includes devices which guide and drive the cylinder that are located within the thermal enclosure. Applicant has previously indicated reasons why this type of configuration is undesirable and why the presently claimed device is an improvement over the prior art.

The Examiner has also indicated that the HORY reference "is not provided with a groove formed in an outside surface of said

cylinder (94) adapted to take powder from a storage means (40,46) and to feed it to said deposition zone." The Examiner relies on OLBERG to provide a teaching directed to the use of a grooved cylinder to transport material. First, the claims of the present application are directed to a device which moves powder that is acted upon by a laser in a thermal enclosure. The OLBERG reference is directed to a rotary scraper for excavating material. Applicant submits that one of skill in the art dealing with powder deposition for a process based on the action of a laser on a material contained in a thermal enclosure would not look to excavating devices to improve the deposition of the powder material. Furthermore, it does not appear that the OLBERG reference teaches a "cylinder provided firstly with at least one groove formed in an outside surface of said cylinder" as claimed by Applicant. The OLBERG reference teaches a bowl 10 comprising end portions 11 with a bottom wall secured thereto, such that the bottom wall has a plane portion 12 with its front edge sharpened as at 13 to provide a cutting edge for the scraper (see OLBERG at column 2, lines 56-60.) The OLBERG reference is directed to a hollow cylinder 10 a part of which 12 defines the edge of an opening allowing access to the inside of the cylinder. It does not appear that the OLBERG reference teach a "groove formed in an outside surface of said cylinder". The Examiner further provides that the "material transfer cylinder in OLBERG is not formed in the same grooved shape as the cylinder of the instant claims".

Applicant submits that the OLBERG reference provides **no teaching** of a "groove formed in an outside surface of said cylinder". Furthermore, the OLBERG reference does not appear to teach a **groove** "adapted to take powder and powder mixtures from a storage means and feed it to a deposition zone". The Examiner relies on PLATSCH to teach a "cylinder (application roller 38) with a cross-sectional groove that is designed to convey powder". However, Applicant submits that the claimed cylinder is "adapted to take powder of powder mixtures from a storage means and feed it to a deposition zone". However, it is clear from reading PLATSCH that the rolls 32, 38 do not move between a storage zone to a deposition zone, but are mounted rotative around a fixed axis. Additionally, the Examiner has cited column 3, lines 66-67 to column 4, lines 1-5 and Fig. 1 in PLATSCH as the teaching for a grooved cylinder designed to convey powder. However, Applicant fails to see where in this passage it is stated that powder is conveyed by these recesses 52, 54. The Examiner further provided that column 1, lines 38-42 and column 2, lines 19-22 in PLATSCH teach the effective and reliable transfer of powder. Again, Applicant fails to find a teaching that the powder is transferred in the groove. In fact, these sections teach that the recess is used "to receive a gripper rod" and that the powder is held on the "circumferential surface of the application roller". Therefore, Applicant submits that the Examiner has failed to provide any teaching in the prior art for a "circular cylinder

provided firstly with at least one groove formed in an outside surface of said cylinder and adapted to take powder or powder mixture from a storage means and feed it to a deposition zone".

Furthermore, Applicant submits that even if one of skill in the art were to look at an agriculture device as disclosed in OLBERG, OLBERG does not teach a cylinder with a groove formed in an outside surface of said cylinder as provide by Applicant, but teaches a longitudinal opening inside a cylinder. For this reason, there is no motivation for modifying the shape of the opening disclosed in OLBERG to give the shape of the roller disclosed by PLATSCH. In other words, even if we applied the teachings of OLBERG and PLATSCH to HORY, we would not arrive at the instantly claimed invention. Applicant submits that the rejections based on the prior art have been overcome and that this application is in condition for allowance.

Claim 6 stands rejected under 35 U.S.C. 103(a) as being unpatentable over HORY and OLBERG and PLATSCH as applied to claims 1-5 and 7-8 above, and further in view of BRENNEMAN (US Patent 3854975). Since claim 6 depends from independent claim 1, Applicant submits that this claim is likewise allowable for the reasons provided above.

Claims 9-10 are rejected under 35 USC 103(a) as being unpatentable over HORY, OLBERG and PLATSCH as applied to claims

1-5 and 7-8 above, and further in view of MOLLER (US Patent application No. 2002/0195439). Since claims 9-10 depend from independent claim 1, Applicant submits that these claim are likewise allowable for the reasons provided above.

As this response is being filed after the shortened statutory period, a separate request for extension of time is submitted herewith. Any deficiencies in any fees necessitated by the filing of the response may be charged to Deposit Account 04-1577.

In view of the foregoing action, it is believed this application should now be in condition for formal allowance, which action is respectfully solicited.

Respectfully submitted,
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